

CLAIMS

1. An observation optical device with a photographing function, having an observation optical system and a photographing optical system, said observation optical system being utilized as a focusing device for said photographing optical system, said observation optical device comprising:

a first focusing mechanism that focuses said observation optical system so as to observe a close-range view through said observation optical system;

a second focusing mechanism that focuses said photographing optical system so as to photograph a close-range view through said photographing optical system;

an association mechanism that associates said first and second focusing mechanisms with each other in such a manner that said observation optical system and said photographing optical system are always kept in a focused state; and

a reticle provided in said observation optical system for focusing said observation optical system with a predetermined dioptric power during an operation of said association mechanism;

said second focusing mechanism being constructed in such a manner that a measured dioptric power difference between a first dioptric power of a combination of an eye of the user and an ocular lens system of said observation optical

system, focusing on said reticle, and a second dioptric power of a combination of the eye and said ocular lens system and an objective lens system of said observation optical system, focusing on an object to be observed, is cancelled.

5 2. An observation optical device according to claim 1, wherein said measured dioptric power difference is obtained as an arithmetic mean of measured dioptric power differences obtained from experiments conducted on a plurality of observers.

10 3. An observation optical device according to claim 1, wherein said association mechanism comprises a rotary wheel member having a manually operated rotary wheel; said observation optical system comprises two optical system elements that are movable along the optical axis of said
15 observation optical system to focus said observation optical system; said first focusing mechanism forms a first movement-conversion mechanism for converting a rotational movement said rotary wheel member into a relative back-and-forth movement of said two optical system elements;
20 said photographing optical system is movable relative to an imaging plane along the optical axis of said photographing optical system to focus said photographing optical system; and said second focusing mechanism forms a second movement-conversion mechanism for converting a rotational
25 movement of said rotary wheel member into a back-and-forth

movement of said photographing optical system elements relative to said imaging plane.

4. An observation optical device according to claim 3, wherein said rotary wheel member comprises a rotary wheel cylinder in which a lens barrel is housed so as to be movable along the central axis of said rotary wheel cylinder; said photographing optical system is housed in said lens barrel; said second movement-conversion mechanism comprises a first cam groove formed in one of said rotary wheel cylinder and said lens barrel, and a first cam follower formed in the other of said rotary wheel cylinder and said lens barrel; and said first cam groove is formed in such a manner that a rotational movement of said rotary wheel cylinder is converted into a back-and-forth movement of said lens barrel along the central axis of said rotary wheel cylinder, and said measured dioptric power difference is cancelled.

5. An observation optical device according to claim 4, wherein said first movement-conversion mechanism comprises a second cam groove formed on an outer surface of said rotary wheel cylinder, an annular member that has a second cam follower engaged with said first cam groove and that is attached on an outer surface of said rotary wheel cylinder to move along the central axis of said rotary wheel cylinder, and a movement transmission mechanism that transmits the movement of said annular member to one of said two optical

system elements of said observation optical system.

6. An observation optical device according to claim 3, wherein said observation optical system forms a pair, so that said observation optical device functions as a binocular
5 telescope with a photographing function.

7. An observation optical device according to claim 6, wherein said pair of observation optical systems are mounted on an optical system mount plate that comprises first and second plates that are movable relative to each other, one
10 of said pair of observation optical systems is placed on said first plate, and the other of said pair of observation optical systems is placed on said second plate, so that the distance between the optical axes of said pair of observation optical systems is adjusted by changing the relative positions of said
15 first and second plates.

8. An observation optical device according to claim 7, wherein said first and second plates are linearly moved relative to each other, so that the optical axes of said pair of observation optical systems are moved in a predetermined
20 plane, whereby the distance between the optical axes of said pair of observation optical systems is changed.